CLAIMS

What is claimed is:

1. A method for collecting sleep quality data, comprising:

detecting physiological and non-physiological conditions associated with sleep quality of a patient; and

collecting sleep quality data based on the detected conditions, wherein collecting the sleep quality data is performed at least in part implantably.

2. The method of claim 1, wherein detecting the conditions comprises detecting a cardiovascular system condition.

3. The method of claim 1, wherein detecting the conditions comprises detecting a respiratory system condition.

4. The method of claim 1, wherein detecting the conditions comprises detecting a muscle system condition.

5. The method of claim 1, wherein detecting the conditions comprises detecting a blood chemistry condition.

6. The method of claim 1, wherein detecting the conditions comprises detecting a nervous system condition.

7. The method of claim 1, wherein detecting the conditions comprises detecting an environmental condition.

8. The method of claim 1, wherein detecting the conditions comprises detecting a contextual condition.

9. The method of claim 1, wherein collecting the sleep quality data comprises collecting data associated with sleep stages.

10. The method of claim 1, wherein collecting the sleep quality data comprises collecting data associated with sleep disruption.

11. The method of claim 1, wherein collecting the sleep quality data comprises collecting data associated with disordered breathing.

12. The method of claim 1, wherein collecting the sleep quality data comprises collecting data associated with a movement disorder.

13. The method of claim 1, further comprising storing the collected sleep quality data.

14. The method of claim 1, further comprising transmitting the collected sleep quality data.

15. A method for assessing sleep quality, comprising:

determining one or more metrics associated with sleep;

determining one or more metrics associated with events that disrupt sleep; and

determining a composite sleep quality metric as a function of the one or more metrics associated with sleep and the one or more metrics associated with events that disrupt sleep.

16. The method of claim 15, wherein at least one of determining the one or more metrics associated with sleep, determining the one or more metrics associated with events that disrupt sleep, and determining the composite sleep quality metric is performed at least in part implantably.

17. The method of claim 15, wherein determining the one or more metrics associated with sleep comprises determining a metric characterizing arousals.

18. The method of claim 15, wherein determining the one or more metrics associated with sleep comprises determining a metric characterizing total time asleep.

19. The method of claim 15, wherein determining the one or more metrics associated with sleep comprises determining a metric characterizing time in bed.

20. The method of claim 15, wherein determining the one or more metrics associated with events that disrupt sleep comprises determining one or more metrics associated with a sleep disorder.

21. The method of claim 15, wherein determining the one or more metrics associated with events that disrupt sleep comprises determining one or more metrics associated with a movement disorder.

22. The method of claim 15, wherein determining the one or more metrics associated with events that disrupt sleep comprises determining one or more metrics associated with disordered breathing.

23. The method of claim 15, wherein determining the one or more metrics associated with events that disrupt sleep comprises determining a metric characterizing sleep time spent in one or more sleep disorders.

24. The method of claim 15, wherein determining the composite sleep quality metric comprises determining a sleep disturbance index.

25. The method of claim 24, wherein determining the sleep disturbance index comprises calculating a metric as a function of a combination of one or more sleep disorder indices and an arousal index.

26. The method of claim 24, wherein determining the sleep disturbance index comprises calculating a metric as a function of a combination of a movement disorder index and an arousal index.

27. The method of claim 24, wherein determining the sleep disturbance metric comprises calculating a metric as a function of a combination of a disordered breathing index and an arousal index.

28. The method of claim 24, wherein the sleep disturbance index is characterizable using the equation:

$$SDI = c_1*DI + c_2*AI$$

where DI is associated with a sleep disorder index, AI is associated with an arousal index, and c_1 and c_2 are constants.

29. The method of claim 15, wherein determining the composite sleep quality metric comprises determining an undisturbed sleep time metric.

30. The method of claim 29, wherein the undisturbed sleep time metric, UST, is characterizable using the equation:

$$UST = TA - STSD,$$

where TA is associated with total time asleep and STSD is associated with sleep time spent in sleep disorders.

31. The method of claim 15, wherein determining the composite sleep quality metric comprises determining an undisturbed sleep efficiency metric.

32. The method of claim 31, wherein the undisturbed sleep efficiency metric, USE, is characterizable using the equation:

$$USE = 100 *(TA - STSD)/TIB,$$

where TA is associated with total time asleep, STSD is associated with sleep time in sleep disorders, and TIB is associated with time in bed.

33. The method of claim 15, further comprising trending at least one of the one or more metrics associated with sleep, the one or more metrics associated with events that disrupt sleep, and the composite sleep quality metric over time.

34. The method of claim 15, further comprising using at least one of the one or more metrics associated with sleep, the one or more metrics associated with events that disrupt sleep, and the composite sleep quality metric for advanced patient management.

35. A method for assessing sleep quality of a patient, comprising:

detecting physiological and non-physiological conditions associated with the sleep quality of the patient;

collecting sleep quality data based on the detected conditions; and

evaluating the sleep quality of the patient using the collected data, wherein at least one of collecting the sleep quality data and evaluating the sleep quality is performed at least in part implantably.

36. The method of claim 35, wherein both collecting the sleep quality data and evaluating the sleep quality are performed at least in part implantably.

37. The method of claim 35, wherein evaluating the sleep quality comprises determining one or more sleep stages.

38. The method of claim 35, wherein evaluating the sleep quality comprises detecting events associated with sleep disruption.

39. The method of claim 38, wherein detecting the events associated with sleep disruption comprises detecting disordered breathing.

40. The method of claim 38, wherein detecting the events associated with sleep disruption comprises detecting movement disorders.

41. The method of claim 35, wherein evaluating the sleep quality comprises determining one or more metrics associated with sleep quality.

42. The method of claim 35, wherein evaluating the sleep quality comprises trending one or more metrics associated with sleep quality over time.

43. The method of claim 35, wherein evaluating the sleep quality comprises determining one or more metrics associated with disordered breathing.

44. The method of claim 35, wherein evaluating the sleep quality comprises determining one or more metric associated with movement disorders.

45. The method of claim 35, wherein evaluating the sleep quality comprises determining one or more composite metrics based on metrics associated with sleep and metrics associated with events that disrupt sleep.

46. The method of claim 35, further comprising transmitting at least one of the sleep quality data and the sleep quality evaluation to a separate device.

47. A method for evaluating sleep quality, comprising:

detecting one or more conditions associated with the sleep quality of a patient during a period of wakefulness;

collecting sleep quality data based on the detected one or more conditions; and

evaluating the sleep quality of the patient using the collected sleep quality data, wherein at least one of collecting the sleep quality data and evaluating the sleep quality is performed at least in part implantably.

48. The method of claim 47, wherein detecting the one or more conditions comprises detecting a physiological condition.

49. The method of claim 47, wherein detecting the one or more conditions comprises detecting a non-physiological condition.

50. The method of claim 47, wherein detecting the one or more conditions comprises detecting a nervous system condition.

51. The method of claim 47, wherein detecting the one or more conditions comprises detecting a cardiovascular system condition.

52. The method of claim 47, wherein

detecting the one or more conditions comprises detecting patient activity; and

collecting the sleep quality data comprises collecting data associated with the patient activity during the period of wakefulness.

53. The method of claim 47, further comprising storing the collected sleep quality data.

54. The method of claim 47, further comprising transmitting the collected sleep quality data.

55. The method of claim 47, wherein evaluating the sleep quality comprises determining one or more sleep quality metrics.

56. The method of claim 47, further comprising transmitting at least one of the sleep quality data and the sleep quality evaluation to a separate device.

57. A medical device, comprising:

a detector system configured to detect physiological and non-physiological conditions associated with sleep quality of a patient; and

a data collection system coupled to the detector system and configured to collect sleep quality data based on the detected conditions, wherein the data collection system includes an implantable component.

58. The device of claim 57, wherein the detector system comprises a patient-internal component.

59. The device of claim 57, wherein the detector system comprises a patient-external component.

60. The device of claim 57, wherein the detector system comprises a patient input device.

61. The device of claim 57, wherein the detector system comprises a wirelessly coupled device.

62. The device of claim 57, wherein the detector system comprises a network accessible device.

63. The device of claim 57, wherein the data collection system is configured to collect data associated with sleep stages.

64. The device of claim 57, wherein the data collection system is configured to collect data associated with events that disrupt sleep.

65. The device of claim 57, wherein the data collection system is configured to collect data associated with disordered breathing.

66. The device of claim 57, wherein the data collection system is configured to collect data associated with a movement disorder.

67. The device of claim 57, further comprising a memory unit configured to store the collected data.

68. The device of claim 57, further comprising a communication unit configured to transmit the collected data.

69. The device of claim 68, wherein the communication unit is configured to transmit the collected data over a wireless link.

70. The device of claim 68, wherein the communication unit is configured to transmit the collected data to a remote device.

71. The device of claim 57, wherein the device is configured to be implemented as a component of an advanced patient management system.

72. A sleep quality evaluation device, comprising:

a detector system configured to detect physiological and non-physiological conditions affecting sleep quality of a patient; and

a sleep quality processor coupled to the detector system and configured to determine one or more metrics associated with sleep and one or more metrics associated with events that disrupt sleep, the sleep quality processor further configured to generate at least one composite sleep quality metric based on the one or more metrics associated with sleep and the one or more metrics associated with events that disrupt sleep.

73. The device of claim 72, wherein at least one of the detector system and the sleep quality processor includes an implantable component.

74. The device of claim 72, wherein both the detector system and the sleep quality processor include an implantable component.

75. The device of claim 72, wherein the one or more metrics associated with events that disrupt sleep characterize a sleep disorder.

76. The device of claim 72, wherein the one more metrics associated with sleep characterize arousals.

77. The device of claim 72, wherein the at least one composite metric characterizes undisturbed sleep time.

78. The device of claim 72, wherein the sleep quality processor is configured to trend over time at least one of the one or more metrics associated with sleep, the one or more metrics associated with events that disrupt sleep, and
the at least one composite sleep quality metric.

79. The device of claim 72, wherein the device is configured to be used as a component of an advanced patient management system.

80. A medical device for evaluating sleep quality, comprising:

a detector system configured to detect physiological and non-physiological conditions associated with sleep quality of a patient;

a data collection system coupled to the detector system and configured to collect sleep quality data based on the detected conditions; and

a data analysis system coupled to the data collection system and configured to evaluate the sleep quality using the collected sleep quality data, wherein at least one of the the data collection system and the data analysis system include an implantable component.

81. The device of claim 80, wherein both of the the data collection system and the data analysis system include an implantable component.

82. The device of claim 80, wherein the data analysis system is configured to detect sleep stages.

83. The device of claim 80, wherein the data analysis system is configured to detect one or more sleep disorders.

84. The device of claim 83, wherein the one or more sleep disorders comprise disordered breathing.

85. The device of claim 83, wherein the one or more sleep disorders comprise a movement disorder.

86. The device of claim 80, wherein the data analysis system is configured to determine one or more metrics associated with sleep quality.

87. The device of claim 80, wherein the data analysis system is configured to trend the sleep quality data over time.

88. The device of claim 80, further comprising a communication system configured to transmit at least one of the collected sleep quality data and the sleep quality evaluation to a separate device.

89. The device of claim 80, wherein the device is configured to be used as a component in an advanced patient management system.

90. A system for collecting sleep quality data, comprising:

means for detecting physiological and non-physiological conditions associated with sleep quality of a patient; and

means for collecting sleep quality data based on the detected conditions, wherein the means for collecting includes an implantable component.

91. The system of claim 90, further comprising means for storing the collected sleep quality data.

92. The system of claim 90, further comprising means for transmitting the collected sleep quality data.

93. A system for assessing sleep quality, comprising:

means for determining one or more metrics associated with sleep;

means for determining one or more metrics associated with events that disrupt sleep; and

means for determining a composite sleep quality metric as a function of the one or more metrics associated with sleep and the one or more metrics associated with events that disrupt sleep.

94. The system of claim 93, further comprising means for trending at least one of the one or more metrics associated with sleep, the one or more metrics associated with events that disrupt sleep, and the composite sleep quality metric over time.

95. A system for assessing sleep quality of a patient, comprising:

means for detecting physiological and non-physiological conditions associated with the sleep quality of the patient;

means for collecting sleep quality data associated with the sleep quality of the patient based on the detected conditions; and

means for evaluating the sleep quality of the patient using the collected data, wherein at least one of the means for collecting and the means for evaluating include an implantable component.

96. A sleep quality evaluation system, comprising:

means for detecting one or more conditions associated with the sleep quality of a patient during a period of wakefulness;

means for collecting sleep quality data based on the one or more conditions; and

means for evaluating the sleep quality of the patient using the collected sleep quality data, wherein at least one of the means for collecting the data and the means for evaluating the sleep quality comprises an implantable component.